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ASIATIC BIRD PLAGUE (NEWCASTLE DISEASE)

P. M. Svintsov

/Digest/

/The author first outlines the immunological and other differences between the European and the Asiatic bird plague. These differences have been established by both USSR and foreign investigators. According to the author, it is still not quite clear to some investigators whether these diseases are caused by two distinct viruses or two different varieties of the same virus. The ultravirus in question could be differentiated from human influenza viruses, however./

The virus of the Asiatic bird plague appears to have a round shape when observed under the microscope and the particles are in most cases provided with a thread-like tail so that they resemble spermatozoids. This virus has been obtained in a concentrated and purified state by precipitating with ammonium sulphate and centrifuging after that. The virus in the concentrated state is a liquid containing 3.3-4.3 milligrams of protein per 1 milliliter, which comprises 95.98 percent with reference to the precipitated virus substance. This compares with a content of 0.02-0.04 milligrams of protein per 1 milliliter of the starting material. The purified virus exhibits an increased activity both immunologically and as far as its virulence is concerned. This opens possibilities of preparing a more active prophylactic vaccine.

Important results on the resistance of the virus against various types of physical and chemical treatment have been obtained by Z. A. Kucherenko, I. A. Artyukh, N. I. Leonov, P. M. Svintsov, I. I. Ochkina, and others (Trudy UIEV /Works of the Ukrainian Institute of Experimental Veterinary Medicine/, Vol XV, 1948; Veterinariya, 1947, No 9; Veterinariya, 1940, No 3; etc).

The results obtained by Prof N. I. Leonov in regard to the effect of formalin on the virus of the Asiatic bird plague are both interesting and of great practical importance. Although it was formerly held that formalin in a concentration of 0.4-0.5 percent kills the virus, Prof Leonov showed in his experiments

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that by using a special technique involving dilution of solutions the virus can be isolated in a living state from formalinized substrates, and that upon isolation it is capable of producing the disease in sensitive chickens.

Of the greatest significance is a recent communication by G. M. Bosh'yan that he, with M. S. Shaburov and M. N. Popov'yants, have succeeded in isolating, by using a special technique, a bacterial form of the Asiatic bird plague from a chicken embryo infected with the virus of that disease. A bacterial culture obtained in this manner grows on artifical nutritive media and the bacteria are visible under the microscope.

Positive results, as far as transformation of the virus form into the bacterial form is concerned, have been obtained both with unfiltered infected material and material passed through a sterilizing filter. In smears under the microscope, the bacterial culture originally exhibited what appeared to be gram-positive granularity. On subsequent seedings carried out in both liquid and solidified artificial nutritive media, bent rods with pointed ends (resembling surgical needles in shape) were first observed -- then gram-positive "rice grains", from which in the next stage of the microbe's development, thick rods disposed individually or in pairs (either in rows or at an angle to each other) were obtained.

The causative factor of Asiatic bird plague could also be obtained in the crystalline state. Under certain definite conditions, the crystals can again be transformed into the virus or bacterial form.

The cultivation of the virus in chicken embryos is now accepted practice both for the preparation of vaccines and for diagnostic purposes, because the embryos are more sensitive to the virus than chickens. The formol-aluminium hydroxide vaccine from embryos has been introduced on an extensive scale in the USSR.

Besides birds, various species of mammals are also susceptible to the Asiatic bird plague. White mice infected intraperitoneally and intracerebrally have died in 3 to 7 days and have exhibited septicemia (I. N. Doroshko, et al). Guinea pigs could be infected by introducing the causative factor into the brain. Syrian hamsters catch the disease upon intracerebral infection. In the case of the last mentioned animals, the disease is of the nerve type and, as a rule, has a lethal outcome. The virus which had been adapted to hamsters was pathogenic to young monkeys on intracerebral infection. A case of accidential infection of a laboratory cat is known. The cat developed symptoms of acute meningoencephalomyelitis and perished on the third day.

Cases of human infection have been reported (three in Australia, 19 in Palestine, and one in Bulgaria). The infection took place either in the laboratory upon accidential introduction of the virus into the eye or in the kitchen which a sick bird was carved. The incubation period in humans takes 3 to 5 days. The symptoms comprise acute conjunctivitis and occasionally general depression. The disease runs its course in 10 to 14 days and ends in recovery.

/The rest of the article deals with practical veterinary aspects of the infection with this disease as it occurs in chickens./

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